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## EPIBOULANGERITE FROM MONTANA

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On June 10, 1916, while visiting the surface plant of the Iron Mountain Mine, a property of the Federal Mining and Smelting Co., located on Flat Creek,  $3\frac{1}{2}$  miles north of Superior, Montana, the writer noticed that all of the zinc ore being mined and milled at the time was intimately intergrown with a steel-gray mineral resembling stibnite. Inquiries were made of the assayer at the mine and he stated that the mineral contained lead. Believing the mineral to be jamesonite, the writer spent some two hours watching the ore as it passed over the sorting belt, and selecting the purest pieces.

The ore being mined at the time all came from the so-called "Zinc Vein," a sphalerite vein, practically free from galena, which is parallel to, and only 30 to 50 feet from, the main vein, a galena vein practically free from zinc. The ore as seen at the mill consisted of fine-grained sphalerite, ranging from steel-black, thru various shades of red-brown to a pale straw-yellow color. The latter variety is by far the most abundant. The gangue is glassy bluish to white quartz. The sulfantimonite is scattered in small grains and needles thruout the sphalerite and the quartz of the gangue, the grains being, for the most part, 1 mm. or less in diameter. The mineral reaches its greatest development, however, in certain bunches of pure white quartz which are apparently slightly later than the main mass of the vein. Here the steel-gray mineral occurs as bunches of needles and fibrous masses, some of which reach several inches in diameter. It is associated with coarse-granular black sphalerite. The only other minerals noted were very rare grains of buff siderite and a little pyrite and pearly smears of sericite on cracks. That the quartz and the sulfantimonite were contemporaneous is proved by the fact that quartz crystals, which occasionally line cavities

in the massive quartz, are filled with variously oriented needles of the other mineral. Altho the needles of the gray mineral project into open cavities and appear to be terminated, a careful search of the material at hand failed to reveal measurable crystals.

Selected steel-gray fibers are soft, having about the hardness of gypsum, and are moderately brittle, breaking at right angles. The streak is blackish lead-gray. The specific gravity was found by means of a Jolly balance to be 6.303 (average of two determinations). A partial analysis on selected material gave Pb 52.74, Sb 20.85%.

While the results are not entirely conclusive, this seems to be closer to the rare species epiboulangerite, than to any other of the difficult group of sulfosalts. The above value for lead is the mean of three closely agreeing determinations and is much too high for jamesonite. The close agreement between this and the analyses of epiboulangerite from Altenberg, Silesia, by Websky, as given in Dana's Mineralogy, is shown in the following table:

TABLE 1

	1	2	3
S.....		21.89	21.31
Sb.....	20.85	20.77	20.23
Pb.....	52.74	56.11	54.88
Ni.....		0.20	0.30
Fe.....		0.60	0.84
Zn.....		0.29	1.32
Specific gravity.....	6.303		6.309

1. Acicular needles in quartz, Iron Mountain Mine, Montana.
2. Granular epiboulangerite, Altenberg, Silesia.
3. Needles of epiboulangerite, Altenberg, Silesia.

The mineral from the Iron Mountain is thus provisionally considered epiboulangerite. A study under the reflecting microscope of a polished section of the material analyzed showed it to be free from impurities. The Iron Mountain mine is closed at present and filled with water, and, in all probability, will never be reopened. The abundant occurrence of this rare sulfantimonite there is, however, worthy of record.

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According to a report which has appeared in the daily press, Professor Freeman F. Burr, who has recently been appointed State Geologist of Maine, has just completed a report on the mineral resources of that state. At least 86 species are known to occur in the state, and some deposits of commercial importance are represented. Twelve pegmatite quarries are being worked.



## THE CARPENTER MINERAL COLLECTION

ALBERT L. STEVENS

*Providence, Rhode Island*

SOME time ago Mr. Horace F. Carpenter, of the firm of H. F. Carpenter and Son, gold and silver refiners, offered his collection, the work of fifty years, to the city of Providence. The collection comprises a large number of minerals, 250 chemical salts, 3,000 species of shells, a fine microscope, and a scientific library of 60 volumes. The gift was formally accepted, and the collection is now arranged in the museum at Roger Williams Park. The gift bears no conditions except that the collection shall be kept intact and properly displayed, and that it shall be known as "The Horace F. Carpenter Collection."

The mineral collection, commencing with a series of mahogany crystal models, and followed by the chemical salts, occupies four double desk-top cases. Trays are used, and the arrangement is according to Dana (6th edition). A good showing is made of native gold, representing nine localities, including a good-sized nugget from Nevada. Gold is further shown as produced by different methods of treatment, reduced by iron, copper, etc., in different degrees of fineness, up to and including 1000/1000 fine or chemically pure. A similar exhibit is made of other metals. There is a fine specimen of cubo-octahedral galena on crystallized siderite, from Greenland. The cube groups of this mineral from Rossie, N. Y., and Galena, Ill., are also good. Other notable sulfide specimens are "black-jack" on a light-colored matrix, from Alston Moor, England; a large cube of pyrite from Idaho; cobaltite crystal in pyrite matrix from Tunaberg, Sweden; and tetrahedrite groups coated with chalcopyrite, from Kapnik, Hungary.

Twenty-five of the South African diamond crystals are shown. In connection with many of the gem stones the artificial product is exhibited beside the natural, as in the case of ruby, sapphire, emerald, aquamarine, opal, etc. Then there is an attractive polished specimen of Madagascar rutilated quartz; a fine polished Lake Superior agate; a handsome plate of selenite from Oklahoma; fine tabular crystals of blue celestite, the largest of which is about 7 x 8 inches, from Strontian Island; babingtonite from Somerville, Mass.; cyanite, Buncombe Co., N. C.; etc.

There is also a goodly number of the "old-time" minerals, notably a crystal of amethyst about  $1\frac{1}{2} \times 5$  inches from Chester Co., Pa., a reminder of the late Charles H. Pennypacker. Among the old English specimens is to be seen a group of reddish-purple fluorite cubes of remarkable clearness, from Derbyshire.

Mr. Carpenter's interest in local minerals is indicated by a good representation of excellent specimens found in this state, among which I would mention: a splendid example of the Bristol amethyst; amethyst crystals from Cumberland; fine transparent smoky quartz crystals, up to  $1 \times 2\frac{1}{2}$  inches in size, from Graniteville; a remarkable polished section of agate, or, as it might more properly be termed, jasper-agate, about 8 inches across, mostly brownish red, banded and mottled with yellow and gray, unlike the dull gray of the usual Rhode Island agates, from Diamond Hill, Cumberland; attractive chalcopyrite with crystallized quartz, from Cumberland Hill; hornblende in a light-colored matrix from Pawtucket; cyanite from Woonsocket; and pyrite nodules and crystallized groups from Block Island.

## GEL MINERALS (COLLOID MINERALS)

CYRIL W. GREENLAND

*Cornell University*

*(Continued from page 124)*

F. CORNU<sup>11</sup> proposed a very interesting theory to explain at least some of the gel minerals. He took, for example, aluminium hydroxide and passed into it dilute phosphoric acid. The resulting mass was a jelly consisting of aluminium hydroxide and adsorbed phosphoric acid. From a consideration of this reaction he proposed that, by a succession of adsorptions, various gel minerals may be produced in nature. These he designated as primary, secondary, tertiary and quaternary gel minerals. A series of this kind he believed to be represented in nature by:

1.  $2\text{Fe}_2\text{O}_3 + 3\text{H}_2\text{O}$  (stilpnosiderite).
2.  $2\text{Fe}_2\text{O}_3 + \text{P}_2\text{O}_5 + \text{Aq.}$  (delvauxite).
3.  $2\text{Fe}_2\text{O}_3 + \text{P}_2\text{O}_5 + 2\text{SO}_3 + \text{Aq.}$  (diadochite).

<sup>11</sup> *Z. Chem. Ind. Kolloide*, 4, 89, 1909.



Further studies may prove that other gel minerals belong to series such as this.

According to F. Cornu<sup>12</sup> the following groups of gel minerals occur in nature:

I. HYDROXIDE GROUP.

- (a) Bauxite,  $(\text{Al}_2\text{O}_3 \cdot n\text{H}_2\text{O})$ . (b) Stilpnosiderite  $(2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O})$ . (c) Opal and its varieties  $(\text{SiO}_2 \cdot n\text{H}_2\text{O})$ . (d) Psilomelanite  $(x\text{MnO}_2 + y\text{MnO} + z(\text{BaO}, \text{K}_2\text{O}, \text{Li}_2\text{O}))$ . (e) Ilsemannite  $(\text{Mo}_2\text{O}_3 + n\text{H}_2\text{O})$ , the only reversible hydrosol in nature [an apparent misinterpretation of this mineral, as pointed out in the first instalment of this article].

II. CARBONATE GROUP.

- (a) Hydrozincite—hydrated zinc carbonate. (b) Baudisserite—magnesium carbonate (doubtful).

III. SULFATE GROUP.

- (a) Glockerite—hydrated iron sulfate. (b) Vitriol-ochers—which consist mostly of glockerite. (c) Pissophanite—like glockerite but containing in addition aluminium.

IV. URANATE GROUP.

Gummite—an alteration product of uraninite (gel nature not certain).

V. HYDRATED PHOSPHATE GROUP.

- (a) Delvauxite—hydrated iron phosphate. (b) Diadochite—similar in composition to delvauxite but in addition contains  $\text{SO}_3$ . (c) Variscite—from Leoben (described by Helmhacker). (d) Evansite— $(3\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 18\text{H}_2\text{O})$ . (e) Fischerite from Roman Gladna [in part]. (f) Plumbogummite—a phosphate of aluminium and lead of doubtful gel nature.

VI. HYDRATED ARSENATE GROUP.

- (a) Pitticite—a hydrated arsenate and sulfate of iron found as an alteration product of arsenopyrite. (b) Ganomatite—an alteration product of smaltite. (c) Lavendulite—a cobalt and nickel-containing copper arsenate.

VII. HYDRATED ANTIMONATE GROUP.

- (a) Bleinierite—a hydrated antimonate of lead. Occurs as an alteration product of jamesonite and bournonite. (b) Thrombolite—a hydrated antimonate of copper. Occurs as an alteration product of tetrahedrite. (c) Antimony ochers in part.

VIII. HYDRATED SILICATE GROUP.

1. CHRYSOCOLLA GROUP.

- (a) Chrysocolla,— $\text{CuSiO}_3 \cdot 2\text{Aq}$ . (Chrysocolla occurs with varying composition and different varieties containing such impurities as silica, iron and copper oxides.) (b) Pilarite. (c) Asperolite.

2. DEWEYLITE GROUP.

- (a) Deweylite—a hydrated magnesium silicate. (b) Cerolite—an aluminium-containing deweylite. (c) Saponite and related hydrated silicates of aluminium and magnesium. (d) Webskyite—an iron-containing silicate of magnesium. (e) Chloropheite and nigrescite—hydrated iron-magnesium silicates. (f) Genthite. (g) Garnierite.

<sup>12</sup> *Ibid.*, pp. 15–18.

3. **PLOMBIERITE GROUP.**

Plombierite— $\text{CaSiO}_3 + n\text{H}_2\text{O}$ —a product of hot springs.

4. **ALUMINIUM SILICATE GROUP.**(a) **ALLOPHANITE GROUP— $\text{Al}_2\text{SiO}_5.n\text{H}_2\text{O}$ .**

Allophanite, scarborite, kieseraluminite, collyrite, carolathine, allophanite containing copper and zinc, plumballophanite, samoite.

(b) **HALLOYSITE GROUP— $\text{Al}_2\text{O}_3.2\text{SiO}_2.2\text{H}_2\text{O}$ .**

Halloysite, indianite, lenzinite, glagerite.

(c) **MONTMORILLONITE GROUP— $\text{H}_2\text{Al}_2\text{Si}_4\text{O}_{12} + n\text{Aq}$ .**

Montmorillonite, razumovskite, steargillite, confolensite, cimolite, severite, anauxite, erinite, hunterite.

5. **HYDRATED METAL SILICATE GROUP.**

Bergseife, bole, teratolite, iron-aluminium silicates; hisingerite, graminite, pinguite, iron silicates, containing an abundance of water.

IX. **ORGANIC GELS.**

Dopplrite, regarded as a calcium salt of humus acid.

In the same article Cornu proposed that when describing the gels of the mineral kingdom one should attempt to give their analogous crystal form. As an example, he presented the following table:

TABLE 2

<i>Formula</i>	<i>Crystal form</i>	<i>Gel form</i>
$\text{Al}_2\text{O}_3.n\text{H}_2\text{O}$ .....	Hydrargillite	Bauxite
$\text{Al}_2\text{O}_3.\text{H}_2\text{O}$ .....	Diaspore	Sporogelite
$\text{Fe}_2\text{O}_3.\text{H}_2\text{O}$ .....	Goethite	Stilpnosiderite
$2\text{Fe}_2\text{O}_3.3\text{H}_2\text{O}$ .....	Limonite	"
$\text{SiO}_2.n\text{Aq}$ .....	Chalcedony ? (containing very little water).	Opal
$\text{MnO}_2.n\text{H}_2\text{O}$ .....	Pyrolusite	Psilomelanite
$2\text{Fe}_2\text{O}_3.\text{P}_2\text{O}_5.3\text{H}_2\text{O}$ .....	Kraurite	Delvauxite
$\text{AlPO}_4.2\text{H}_2\text{O}$ .....	Variscite	Gelvariscite
$2\text{Al}_2\text{O}_3.\text{P}_2\text{O}_5.8\text{H}_2\text{O}$ .....	Fischerite	Gelfischerite
	Diadochite	Geldiadochite
$\text{CuSiO}_3.\text{H}_2\text{O}$ .....	Diopase	Chrysocolla
$\text{H}_4(\text{Mg},\text{Fe})_3\text{Si}_2\text{O}_9$ .....	Serpentine	Webskyite
$\text{CaSiO}_3$ .....	Wollastonite	Plombierite
$\text{H}_4\text{Al}_2\text{Si}_2\text{O}_9$ .....	Kaolinite	Kaolin (clay)
$\text{Al}_2\text{Si}_4\text{O}_{11}.\text{H}_2\text{O}$ .....	Pyrophyllite	Gelpyrophyllite
$\text{H}_4\text{Fe}_2\text{Si}_2\text{O}_9$ .....	Nontronite	Unghwarite

Since the property of adsorption is so characteristic of gels in general, many attempts have been made, by means of dyestuffs, to obtain a method for the rapid recognition of gel minerals. E. Dittler<sup>13</sup> has published the results of the effect of certain dyestuffs on mineral powders, the great majority of which are gel minerals (Table 3).

<sup>13</sup> *Z. Chem. Ind. Kolloide*, 5, 93-100, 1909.

TABLE 3  
HYDROXIDE GROUP

Mineral, locality	Composition, reaction	1 Methyl orange	2 Fuchsin- B	3 Acid violet	4 Methyl- ene-blue +fuch- sin-S	5 Methyl- green+ rhoda- mine
Limonite, Salzburg Umber	$2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ . Acid (Limonite with clay and man- ganese ox- ide.) Acid	Colorless  Yellow	Very dark “	Faint  “	Methyl- ene blue “	Methyl- green “
Xantho- siderite	$\text{Fe}_2\text{O}(\text{OH})_4$ . Acid	Colorless	Dark	“	“	“

## HYDRATED PHOSPHATES, ETC.

Torbernite (crystal- lized)	$\text{CuO} \cdot 2\text{UO}_2 \cdot \text{P}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$ . Acid	Orange	Medium dark	Faint	M. B. > F. S.	M. G. > Rhod.
Vivianite (crystal- lized)	$\text{Fe}_3\text{P}_2\text{O}_8 \cdot 8\text{H}_2\text{O}$ . Faintly acid	Indif- ferent	Faint	“	M. B. = F. S.	M. G. = Rhod.
Pharmaco- lite (crys- tallized)	Alkaline	Yellow	Medium dark	Dark	M. B. = F. S.	M. G. = Rhod.
Pyromor- phite (crys- tallized). Globular aggregate	$\text{Pb}_3\text{Cl}(\text{PO}_4)_3$ . Indifferent	Indif- ferent	Faint	Faint	M. B.	M. G.
Diadochite, Bohemia	Acid	Orange	Dark	“	M. B. > F. S.	M. G. > Rhod.
Erythrite, Joachimsthal	$\text{Co}_3(\text{AsO}_4)_2$ . Acid	“	“	Medium dark	M. B.	M. G.
Bindheimite, Cornwall, England	—	Colorless	Medium dark	Faint	M. B. > F. S.	M. G. > Rhod.
Variscite, Vogtland	$\text{AlPO}_4 \cdot 2\text{H}_2\text{O}$ .	Indif- ferent	Faint	Very faint	M. B. = F. S.	—
Wapplerite (crystal- lized), Joa- chimsthal	Faintly acid	Yellow	Dark	Very dark	M. B. = F. S.	M. G. = Rhod.
Delvauxite	Acid	Colorless	Very dark	Faint	M. B.	M. G.
Pitticite, Felsobanya, Pitticite, Joachimsthal	—	Colorless	Medium dark	“	M. B. = F. S.	M. G. = Rhod.

## ALUMINA-SILICIC ACID GROUP

Dillnite, Schemnitz	Very acid	Orange	Very dark	Dark	M. B. > F. S.	M. G. > Rhod.
Myelin	Acid	Colorless	“	Faint	M. B.	M. G.



## ALUMINA-SILICIC ACID GROUP

<i>Mineral, locality</i>	<i>Composition, reaction</i>	1 <i>Methyl orange</i>	2 <i>Fuchsin- B</i>	3 <i>Acid violet</i>	4 <i>Methyl- ene-blue +fuch- sin-S</i>	5 <i>Methyl- green + rhoda- mine</i>
Allophanite	Very acid	Orange	Very dark	Medium dark	M. B.	M. G.
Sphragidite (Lemberg)	Very acid	Colorless	"	"	M. B.	M. G.
Glagerite	Very acid	"	"	"	M. B. > F. S.	M. G. > Rhod.
Teratolite	Acid	"	"	Faint	M. B. > F. S.	M. G. > Rhod.
Orawitzite	Acid	Yellow	"	Medium dark	M. B. > F. S.	M. G. > Rhod.
Razumof- skite	Very acid	Colorless	Dark	Faint	M. B.	M. G.
Chromocher, Halle	—	"	"	Medium dark	M. B.	M. G.
Schrotterite	Weakly acid	Yellow	Medium dark	"	M. B. = F. S.	M. G. = Rhod.
Chloropal	Very acid	"	Very dark	"	M. B. > F. S.	—

## TALC GROUP

Cerolite	Very alkali- line	Colorless	Dark	Dark	M. B. < F. S.	M. G. < Rhod.
Quinzite	Acid	Orange	Medium dark	Faint	M. B. > F. S.	—
Picrolite	Very alkali- line	Yellow	Dark	Dark	M. B. < F. S.	M. G. < Rhod.
Pilinite	Alkaline	Orange	Medium dark	Faint	M. B. = F. S.	M. G. = Rhod.
Garnierite, New Caledonia	Acid	Colorless	Very dark	Dark	M. B. > F. S.	—
Spadaite	Weakly alkaline	Yellow	Medium dark	"	M. B. = F. S.	—
Schweitzer- ite (light picrolite)	Alkaline	"	Very dark	"	M. B. < F. S.	—

## MISCELLANEOUS

Chrysocolla	Very acid	Orange	Dark	Medium dark	M. B. = F. S.	M. G. = F. S.
Gummite	(61-75% UO <sub>3</sub> ) Acid	Colorless	Very dark	Faint	M. B.	M. G.
Hydrozin- cite	Acid	Indif- ferent	"	Very dark	M. B. > F. S.	—
"Erbsen- stein"	CaCO <sub>3</sub> . (Alkaline)	Yellow	"	"	M. B. = F. S.	M. G. = Rhod.

(To be continued)



## LAMELLAR CALCITE AT KEYSTONE, SOUTH DAKOTA

EDGAR T. WHERRY

*Washington, D. C.*

IN May, 1917, in the course of the writer's visit to the South Dakota School of Mines at Rapid City, Professor J. J. Runner called his attention to a peculiar form of calcium carbonate occurring in the Columbia gold mine at Keystone. The fissures in the chloritic schist country rock of this deposit are filled in part with gold-bearing translucent quartz, and in part with the carbonate mineral. Many specimens can be picked up on the mine dump. Some of the carbonate shows the typical rhombohedral cleavage of calcite, but most of it is made up of lamellas with a pearly luster. In convergent polarized light these lamellas yield interference figures which are biaxial with a small axial angle, like aragonite, and Professor Runner regarded them as representing the latter mineral. In other respects, however, the material is not essentially different from the lamellar calcite which has been described in two previous articles in this magazine.<sup>1</sup> The indices of refraction and the specific gravity are essentially those of calcite, and the transition from the normal to the lamellar form is too gradual for distinct crystalline substances to be represented. The unexpected optical behavior suggests, however, a possible explanation of the origin of the lamellar structure: it may be due to the partial alteration of the calcite into aragonite. Further study of this possibility is to be desired.

<sup>1</sup> Lamellar calcite in Rhode Island. A. C. Hawkins. *Am. Min.*, 1 (1), 3, 1916; in Pennsylvania. S. G. Gordon. *Ibid.*, 1 (4), 55, 1916.

## NOTES AND NEWS.

The Quarterly Bulletin of the Mineral Collector's Association for July-September, 1917 has been issued. It contains an announcement of the raising of the dues to 50 cents per year, payable in advance. Five new members have been added to the society. The Secretary's address is: Edmund Everett Hobbs, Sr., 3 Marron Ave., Utica, N. Y.

We regret to announce the death on October 9th of Amos Peaslee Brown, Professor of Mineralogy and Geology in the University of Pennsylvania. An account of his life and work will be published in a future number of this magazine.

## PHILADELPHIA MINERALOGICAL SOCIETY ANNOUNCEMENTS.

Meeting December 13, 1917. Diseases of minerals. Dr. Henry Leffman. Trips: Sunday, November 18. Edge Hill and Five Points. Meet at City Line, Chestnut Hill at 9 A.M. Thanksgiving Day, November 29. Brinton's Quarry, Osborn's Hill, and Strodes Mill. Meet at 69th St. Terminal at 8.15 A.M.

## ABSTRACTS OF MINERALOGICAL LITERATURE

RECENT ADVANCES IN SCIENCE; MINERALOGY AND CRYSTALLOGRAPHY. ALEXANDER SCOTT, University, Glasgow. *Science Progress*, 45, 36-41, July, 1917.

PRELIMINARY NOTE ON SOME MINERALS OF THE METALLIFEROUS DEPOSITS OF BORGOFRANCO D'IVREA. G. LINCIO, University of Modena. *Atti accad. Lincei*, 25, I, 227-230, 1916; thru *Chem. Abstr.*, 11 (7), 767.

A fibrous lead-gray mineral was analyzed and proved to be an impure antimoniferous arsenic (As, Sb). E. T. W.

THE CHEMICAL COMPOSITION OF A SULFO-SALT FROM SAN GIORGIO, SARDINIA. PROBO COMUCCI, Florence. *Atti accad. Lincei*, 25, II, 111-114, 1916; thru *Chem. Abstr.*, 11 (7), 767.

The composition of the mineral was found to be  $1.66 \text{ PbS} \cdot \text{Sb}_2\text{S}_3$ ; it is thus near pligionite. E. T. W.

NOTABLE CRYSTALS OF CALCITE FROM ANDREASBERG HARZ. C. VIOLA. *Atti accad. Lincei*, 25, II, 23-28, 1916; thru *Chem. Abstr.*, 11 (7), 767.

A crystallographic description of a specimen in the mineralogical museum, at Parma. E. T. W.

THE CYCLOPITE (ANORTHITE) FROM SANTA MARIA LA SCALA, NEAR ACIREALE. S. D. FRANCO, University of Catania. *Atti accad. Lincei*, 25, I, 693-697, 1916; thru *Chem. Abstr.*, 11 (7), 767.

A crystallographic description and analysis are given. E. T. W.

THE SO-CALLED THULITE-PYROSCLERITE ROCK FROM CAMPO A PERI, ELBA. PROBO COMUCCI, Florence. *Atti accad. Lincei*, 25, I, 693-697, 1916; thru *Chem. Abstr.*, 11 (7), 768.

Analysis shows this thulite to be a variety of zoisite. E. T. W.

THE CRYSTALLOGRAPHIC CONSTANTS OF EPIDOTE AND OF CLINOZOISITE BETWEEN 15 AND 400°. FAUSTA BALZAC, University of Turin. *Atti accad. Lincei*, 25, I, 811-815, 1916; thru *Chem. Abstr.*, 11 (7), 768.

The changes in angles with temperature are different for these two minerals, showing their distinctness. E. T. W.

CRYSTALLOGRAPHIC NOTE ON THE PIEDMONTITE FROM ST. MARCEL, VALLE D'AOSTA. FAUSTA BALZAC, University of Turin. *Atti accad. Lincei*, 25, I, 589-592, 1916; thru *Chem. Abstr.*, 11 (7), 768.

A crystallographic description. E. T. W.

CRISTOBALITE. H. LE CHATELIER. *Compt. rend.*, 163, 948-952, 1916. A crystallographic description. E. T. W.

EXPERIMENTS IN ETCHING SPHERES OF QUARTZ AND  $\alpha$ -QUARTZ. R. NACKEN, Tübingen. *Neues Jahrb. Min. Geol.*, 1916, I, 71-82.

Small spheres were cut from an untwinned crystal, and etched with  $\text{HF} + \text{H}_2\text{SO}_4$  and at higher temperatures with fused  $\text{NaPO}_3$ . After heating with the latter to 700°, the etch-figures were studied. They must correspond to  $\alpha$ -quartz, since ordinary quartz goes over into that form at 575°, and their arrangement proves that  $\alpha$ -quartz is hexagonal-trapezohedral in symmetry.

E. T. W.



INCLUSIONS OF IRON MINERALS IN MICA AND SOME PROPERTIES OF GOETHITE. O. MÜGGE, Göttingen. *Neues Jahrb. Min. Geol.*, 1916, I, 55-70.

The occurrence of goethite and of colloidal iron hydroxide from which it has been derived in plates of mica from India is described. E. T. W.

SOME NOTES ON JAPANESE MINERALS. S. ICHIKAWA. *Am. J. Sci.* [4], 44 (7), 63-68, 1917.

Comprises notes on: Natural etching of garnet crystals; elongated gypsum crystals; dendrites of manganese oxide. S. G. G.

ILSEMANNITE, HYDROUS SULFATE OF MOLYBDENUM. WALDEMAR T. SCHALLER, U. S. Geol. Survey. *J. Wash. Acad. Sci.*, 7 (13), 417-420, 1917.

An analysis of ilsemannite from near Ouray, Utah, is presented, and the mineral is shown to be a sulfate and not an oxide as heretofore supposed. The formula  $\text{MoO}_3 \cdot \text{SO}_3 \cdot 5\text{H}_2\text{O}$  is suggested. It may have originated by the oxidation of molybdenite, or of the colloidal form of this, jordisite, or the alteration of other molybdenum-bearing minerals. S. G. G.

THE THERMODYNAMIC REVERSIBILITY OF THE EQUILIBRIUM RELATIONS BETWEEN A STRAINED SOLID AND ITS LIQUID. F. E. WRIGHT AND J. C. HOSTETTER, Geophysical Laboratory. *J. Wash. Acad. Sci.*, 7 (13), 405-417, 1917. An experimental study of crystal growth under pressure. S. G. G.

THE NOMENCLATURE AND CLASSIFICATION OF THE NATIVE ELEMENT MINERALS. EDGAR T. WHERRY, U. S. National Museum. *J. Wash. Acad. Sci.*, 7 (14), 447-456, 1917.

The nomenclature of the native elements is discussed and a revised classification of them proposed. A table is given showing the classification, with reasons for the names adopted, synonyms, and references to the literature when the minerals are not noted in Dana's System. Reprints obtainable from author on request. S. G. G.

RADIOACTIVE HALOS. J. JOLY. *Nature*, 99 (2492), 456-458; (2493), 476-478, 1917.

THE ORIGIN OF FLINT. A discussion.

E. RAY LANKESTER, —*Nature*, 99 (2484), 283-284, 1917,—briefly reviews some of the previous work on the origin of the black flint nodules occurring abundantly in stratified layers in the Upper-Chalk of England. L. points out the occurrence of continuous sheets of black tabular flint occurring as fissure-fillings that traverse the stratified layers of chalk, and flint nodules at a sharp angle, which may be seen to advantage at a chalk escarpment—at Rottingdean, near Brighton. Such an occurrence indicates the deposition of the flint after the fissuring of the chalk, and, therefore, almost certainly, after its elevation, and probably due to atmospheric fresh-water. He, further, believes it improbable that the nodules originated differently from the tabular masses. A further fact of importance is that the color of the flint is presumably due to carbon. Arsenic was found in the flints; this may be due to its original presence in minute quantities in sponges. Some of the problems of the physical properties of flints are noted.

R. M. CAVEN, *ibid.* (2485), 306, 1917, asks if ferrosiferrous oxide may not be the coloring agent of the flint instead of carbon.

BENJAMIN MOORE, *ibid.* (2486), 324, 1917, suggests the following theory: The flints are often fantastically shaped, sometimes like gnarled roots, but there is usually one spot which looks like the gutter of a mould. "This suggests that the silica might have trickled thru an opening in the chalk held



up in colloidal solution by carbonic acid, and then the carbonic acid combining with the calcium carbonate of the chalk, forming soluble calcium bicarbonate, thus at the same time enlarging the cavity and producing the conditions for the deposit of the silica, which is no longer held up by the carbonic acid, and is precipitated by the crystalloidal calcium bicarbonate now gone into solution." This view is supported by the tabular flints referred to by Lankester. An attempt was made to imitate this procedure experimentally, which is described.

GRENVILLE A. J. COLE, *ibid.* (2486), 324, 1917, points out that microscopic examination of thin sections shows that the vast majority of flints are the result of chemical replacements of the limestones in which they occur, excluding fissure fillings.

S. C. BRADFORD, *ibid.* (2486), 324, 1917, remarks that the structure of flints, referred to as consisting of minute crystals of silica imbedded in colloid silica, may indicate the formation of such flints from the gradual crystallization of silicic acid gels [in other words, that flint is a meta-colloid. Editor].

Cecil CARUS-WILSON, *ibid.* (2487), 345, 1917, asks why the color of flints, if it be due to carbon, does not extend to the white cortex. As Judd pointed out, the black color is an optical effect, the black silica becoming white on powdering.

J. J. ALLEN, *ibid.* (2487), 345, 1917, believes Dr. Caven's suggestion that the color is due to ferrosferic oxide is supported by the fact that flints which have been in contact with gas-lime become stained deep blue, which has been shown by analysis to be due to ferric ferrocyanide. S. G. G.

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STUDIES ON THE ORIGIN OF MISSOURI CHERTS AND ZINC ORES. G. H. COX, R. S. DEAN, AND V. H. GOTTSCHALK. *Bull. School Mines and Met., Univ. Mo.*, 3 (2), 34 pages, 1916.

Includes a discussion of colloids, with special reference to the silica occurring as chert and jasperoid in the Joplin region. The dark color of some jasperoid, usually ascribed to organic matter, is shown to be due to colloidal PbS or CuS. The sulfide minerals of this deposit are believed to have been transported as colloids. The varying colors of the sphalerites found in this region are suggested to be due to pyrite and its alteration products, mostly in submicroscopic inclusions. E. T. W.

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THE CRYSTAL FORM OF SPENCERITE. T. L. WALKER, Royal Ontario Museum of Mineralogy, Toronto. *J. Wash. Acad. Sci.*, 7 (14), 456-458, 1917.

Small druses of crystals were obtained from cavities sealed by calamine from the type locality, the H. B. Mine, near Salmo, B. C. Monoclinic:  $a : b : c = 1.0125 : 1 : 1.0643$ ;  $\beta = 63^\circ 13'$ . The following forms were measured: 120, 230, 110, 520, 101, 100, 001,  $\bar{1}04$ ,  $\bar{1}02$ ,  $\bar{3}04$ ,  $\bar{1}01$ ,  $\bar{2}01$ , 023, 021, 121, 346,  $\bar{1}11$ ,  $\bar{1}21$ ,  $\bar{2}21$ , and  $\bar{2}41$ . All the crystals are twinned. S. G. G.

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THE COLOR OF AMETHYST, ROSE AND BLUE VARIETIES OF QUARTZ. THOMAS L. WATSON AND R. E. BEARD, University of Virginia. *Proc. U. S. Nat. Mus.*, 53, pp. 553-563, 1917.

The work of previous writers is discussed and the results of analyses, microscopic examination and heating tests by the authors are given. These are thought to confirm the authors' view that a very small amount of Mn present causes the color of the amethyst, and that the color of rose quartz can not be due to an inorganic substance. It is thought improbable that the colors are due to the foreign inclusions visible under the microscope in the case of amethyst and rose quartz. The senior author believes, however, that the color of the blue quartz of Virginia and elsewhere is due to the behavior of light on the minute rutile inclusions and not to a state of strain, as has been suggested. S. G. G.